

AMENDMENTS TO THE CLAIMS

1-12. (Cancelled)

13. (Previously Presented) A synchronization establishment apparatus operable to establish synchronization from a received signal that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative, said synchronization establishment apparatus comprising:

positive/negative change timing detection means for detecting a timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal; and

synchronization establishment means for establishing synchronization from the received signal based on the timing detected by said positive/negative change timing detection means;

wherein a preamble pattern in which 1001 is repeated in $\pi/4$ -shift QPSK is used as the synchronization establishment signal, and a burst signal containing the preamble pattern is used as the received signal; and

wherein said synchronization establishment apparatus further comprises:

an amplitude difference detection circuit operable to use an A/D converter to convert the received burst signal from an analog signal to a digital signal, to square the value of the converted digital signal, and to output the temporal change of the squared value as a difference signal;

a low pass filter operable to filter the difference signal outputted from said amplitude difference detection circuit, and to output the filtered signal,

a polarity bit converter operable to output data of different values when the polarity value of the filtered signal outputted from said low pass filter is positive than when the polarity value of the filtered signal outputted from said low pass filter is negative;

a change point extraction circuit operable to, based on the value outputted from said polarity bit converter, extract the timing at which the value of the waveform of the amplitude difference based on the squared value crosses the zero point;

a change point measurement circuit operable to average the positive/negative change point timing of the extracted amplitude difference based on the squared value;

a clock synchronization establishment circuit operable to, based on the value of the positive/negative change point timing averaged by said change point measurement circuit, establish clock synchronization; and

a timing generation circuit operable to, based on the timing at which the received burst signal starts, determine a position to reset a clock.

14. (New) A synchronization establishment apparatus operable to establish synchronization from a received signal that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative, said synchronization establishment apparatus comprising:

positive/negative change timing detection means for detecting a timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal; and

synchronization establishment means for establishing synchronization from the received signal based on the timing detected by said positive/negative change timing detection means;

wherein a preamble pattern is used as the synchronization establishment signal, and a burst signal containing the preamble pattern is used as the received signal; and

wherein said synchronization establishment apparatus further comprises:

an amplitude difference detection circuit operable to use an A/D converter to convert the received burst signal from an analog signal to a digital signal, to square the value of the converted digital signal, and to output the temporal change of the squared value as a difference signal;

a low pass filter operable to filter the difference signal outputted from said amplitude difference detection circuit, and to output the filtered signal,

a polarity bit converter operable to output data of different values when the polarity value of the filtered signal outputted from said low pass filter is

positive than when the polarity value of the filtered signal outputted from said low pass filter is negative;

a change point extraction circuit operable to, based on the value outputted from said polarity bit converter, extract the timing at which the value of the waveform of the amplitude difference based on the squared value crosses the zero point;

a change point measurement circuit operable to average the positive/negative change point timing of the extracted amplitude difference based on the squared value;

a clock synchronization establishment circuit operable to, based on the value of the positive/negative change point timing averaged by said change point measurement circuit, establish clock synchronization; and

a timing generation circuit operable to, based on the timing at which the received burst signal starts, determine a position to reset a clock.

15. (New) A synchronization establishment apparatus operable to establish synchronization from a received signal that contains a synchronization establishment signal whose change in amplitude periodically alternates between positive and negative, said synchronization establishment apparatus comprising:

positive/negative change timing detection means for detecting a timing of changes in the positive/negative polarity of the change in amplitude of the synchronization establishment signal contained in the received signal; and

synchronization establishment means for establishing synchronization from the received signal based on the timing detected by said positive/negative change timing detection means;

wherein a preamble pattern in quadra-phase modulation is used as the synchronization establishment signal, and a burst signal containing the preamble pattern is used as the received signal; and

wherein said synchronization establishment apparatus further comprises:

an amplitude difference detection circuit operable to use an A/D converter to convert the received burst signal from an analog signal to a digital signal, to

square the value of the converted digital signal, and to output the temporal change of the squared value as a difference signal;

a low pass filter operable to filter the difference signal outputted from said amplitude difference detection circuit, and to output the filtered signal,

a polarity bit converter operable to output data of different values when the polarity value of the filtered signal outputted from said low pass filter is positive than when the polarity value of the filtered signal outputted from said low pass filter is negative;

a change point extraction circuit operable to, based on the value outputted from said polarity bit converter, extract the timing at which the value of the waveform of the amplitude difference based on the squared value crosses the zero point;

a change point measurement circuit operable to average the positive/negative change point timing of the extracted amplitude difference based on the squared value;

a clock synchronization establishment circuit operable to, based on the value of the positive/negative change point timing averaged by said change point measurement circuit, establish clock synchronization; and

a timing generation circuit operable to, based on the timing at which the received burst signal starts, determine a position to reset a clock.